

2 ~~19~~. A paperboard core as recited in claim ~~18~~ wherein said at least one structural ply has a modulus of elasticity in the cross machine direction of greater than 5000 Mpa.

3 ~~20~~. A paperboard core as recited in claim ~~19~~ wherein said at least one structural ply has a modulus of elasticity in the machine direction of greater than 8000 Mpa.

4 ~~21~~. A paperboard core as recited in claim ~~20~~ wherein said paperboard core has a wall thickness of at least 10 mm, and an inside diameter of at 70 mm; and wherein said core has a paperboard ply located in the middle thereof, said middle paperboard ply having a width selected from the group consisting essentially of: if the core inside diameter is between 73-110 mm, at least 185 mm; if the core inside diameter is between 111-144 mm, at least 205 mm; if the core inside diameter is between 145-180 mm, at least 210 mm; and if the core inside diameter is between 181-310 mm, at least 220 mm; except that the maximum ply width is (π times the core diameter).

5 ~~22~~. A paperboard core as recited in claim ~~18~~ wherein said at least one structural ply has a modulus of elasticity in the cross machine direction of greater than 6500 Mpa, and wherein said at least one structural ply has a modulus of elasticity in the machine direction of greater than 8000 Mpa.

6 ~~23~~. A paperboard core as recited in claim ~~22~~ wherein said paperboard core has a wall thickness of at least 10 mm, and an inside diameter of at 70 mm; and wherein said core has a paperboard ply located in the middle thereof, said middle paperboard ply having a width selected from the group consisting essentially of: if the

core inside diameter is between 73-110 mm, at least 230 mm; if the core inside diameter is between 111-144 mm, at least 230 mm; if the core inside diameter is between 145-180 mm, about 350-450 mm; and if the core inside diameter is between 181-310 mm, about 350-500 mm; except that the maximum ply width is (π times the core diameter).

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24. A paperboard core comprising:

a plurality of spirally wound paperboard structural plies forming said paperboard core, and wherein at least one of said paperboard structural plies has a machine direction modulus of elasticity of at least 7500 Mpa, and a cross machine direction modulus of elasticity greater than 4500 Mpa.

25. A paperboard core as recited in claim 24 wherein said core has a wall thickness; and wherein the total thickness of said structural plies is at least 1/5 of said core wall thickness, and wherein the machine direction modulus of elasticity is greater than 8000 Mpa and the cross machine direction modulus of elasticity is greater than 6500 Mpa.

26. A paperboard core as recited in claim 25 further comprising yarn wound around said core, so that said core serves as a yarn carrier.

27. A paperboard core as recited in claim 25 further comprising thin films or foil wrapped around said core, so that said core serves as a film or foil tube.

28. A method of making a useable paperboard core using a plurality of paperboard structural plies, at least one of which has a machine direction modulus of elasticity of at least 7500 Mpa, and a cross machine direction modulus of elasticity greater than 4500 Mpa, comprising:

(a) spirally winding the structural plies into a paperboard core.

29. A method as recited in claim 28 wherein the paperboard core has a wall thickness, and wherein (a) is practiced so that the structural plies of the formed paperboard core have a thickness of at least $1/5$ of the core wall thickness

30. A method as recited in claim 28 further comprising (b) winding yarn on the paperboard core, so that the core functions as a yarn carrier.

31. A method as recited in claim 28 further comprising (b) winding thin film or foil on the paperboard core, so that the core functions as a film or foil tube

32. A method as recited in claim 28 wherein (a) is practiced to produce a core having a wall thickness of at least 10 mm and an inside diameter of over 70 mm; and further comprising (b) winding a material on the paperboard core, and (c) unwinding the material from the paperboard core; and wherein (b) and (c) are practiced at a speed of at least about 200 meters/min.

33. A method as recited in claim 28 wherein the at least one structural ply is manufactured by the Condebelt process

34. A method as recited in claim 29 wherein (a) is practiced to produce a core having a wall thickness of at least 10 mm and an inside diameter of over 70 mm; and further comprising (b) winding a material on the paperboard core, and (c) unwinding the material from the paperboard core; and wherein (b) and (c) are practiced at a speed of at least about 200 meters/min.

35. A method as recited in claim 34 further comprising (b) winding yarn on the paperboard core, so that the core functions as a yarn carrier.